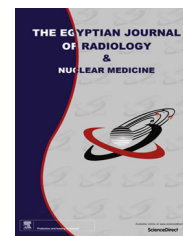




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CASE REPORT

Unexpected large benign thymoma on myocardial scintigraphy, a case report



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Abstract Myocardial perfusion imaging (MPI) by 99mTc-sestamibi constitutes a major part of nuclear medicine studies. Incidental detection of extracardiac abnormalities occurs not infrequently. These can include benign and malignant lesions and their detection can be of great value in patient's future.

We present a 60 year-old man who underwent MPI to evaluate coronary artery disease as the possible cause of his chest discomfort. The images revealed a large area of intense increased tracer uptake in the antero- inferior mediastinum that further evaluation confirmed to be a benign thymoma.

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1. Introduction

99mTc-sestamibi is a lipophilic cationic agent used mainly for myocardial perfusion imaging (MPI). It localizes by passive diffusion and intracellular retention. Non-cardiac normal tracer uptake with various intensities can be seen in the lungs, lactating breasts, liver, gallbladder and bowel. The incidence of extracardiac incidental findings in SPECT studies of the heart varies greatly from 0.69% non-cardiac findings by Jones et al. to 22.55% intra-thoracic and intra-abdominal findings by Shin et al. (1).

Extracardiac pathologic uptake can occur in benign or malignant tumors, infectious and non-infectious diseases.

Thymoma is a rare tumor (incidence rate: 0.15/100,000) with a largely indolent growth pattern. It has malignant potential and can invade locally and metastasize regionally. Thymomas constitute 20% of mediastinal tumors and are the most common tumor of the anterior mediastinum. It typically presents in 4th or 5th decades of life. Fifty percent of patients are asymptomatic and incidentally detected (2).

2. Case report

Our patient was a 60 year-old man with atypical chest pain and hyperlipidemia who was referred for MPI. He performed exercise test and 20 mCi 99mTc-MIBI was injected when he achieved 90% of predicted maximum heart rate for his age at the 3rd stage according to the Bruce protocol. Fifteen

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minutes after injection, SPECT images were obtained using a single-headed MIE gamma camera, equipped with a LEAP collimator. Images were acquired in a 180 degree arc in step and shoot mode with 32 projections, matrix 64×64 and 25 s per projection. Noting hypoactivity in the inferior wall on the stress phase, we obtained a left lateral planar image in addition to repeating the study in the prone position. No significant inferior wall hypoactivity was detected on these additional images, approving the possibility of diaphragmatic attenuation rather than ischemia in that region.

Rest images was obtained on the following day with the same imaging parameters.

The reconstructed images showed no evidence of ischemia (Fig. 1). But cinematic review of the raw data to check possible

motion, revealed a large area of increased tracer uptake, isoactive with the heart, in the right side of the lower mediastinum on both phases of the study (Figs. 2 and 3). Chest X-ray and CT scan were requested. CT scan showed a 90×73 mm well defined enhancing soft tissue mass corresponding to the uptake area (Figs. 4 and 5). The patient underwent biopsy and the mass was proved to be a benign thymoma on histology. He refused further surgical treatment.

3. Discussion

^{99m}Tc -sestamibi is widely used for MPI. It is also well-known as a tumor-imaging agent. The exact mechanism of ^{99m}Tc -MIBI uptake is not well known. It seems to be more closely

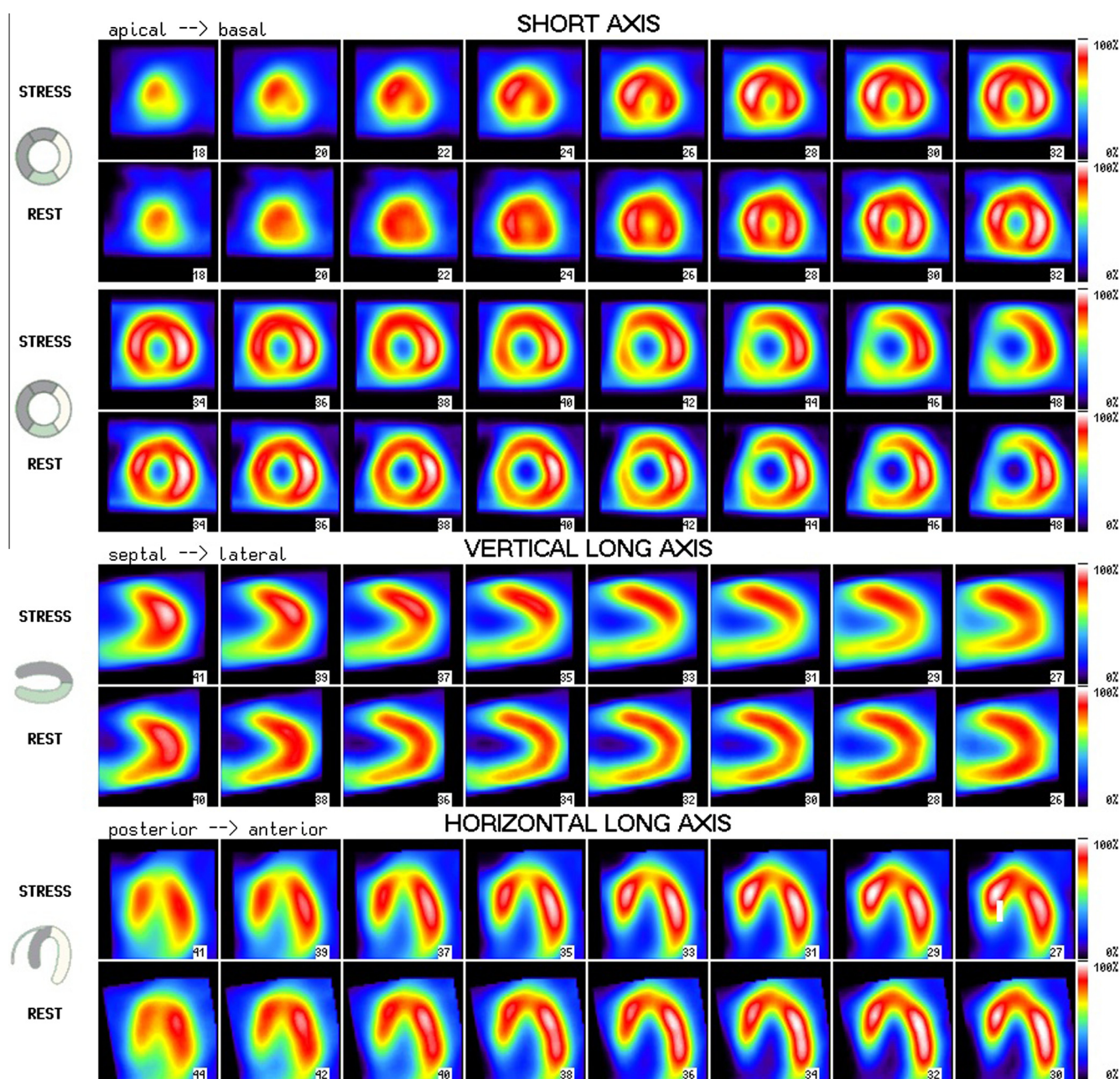


Fig. 1 Reconstructed myocardial perfusion SPECT images reveal no significant reversible ischemia.

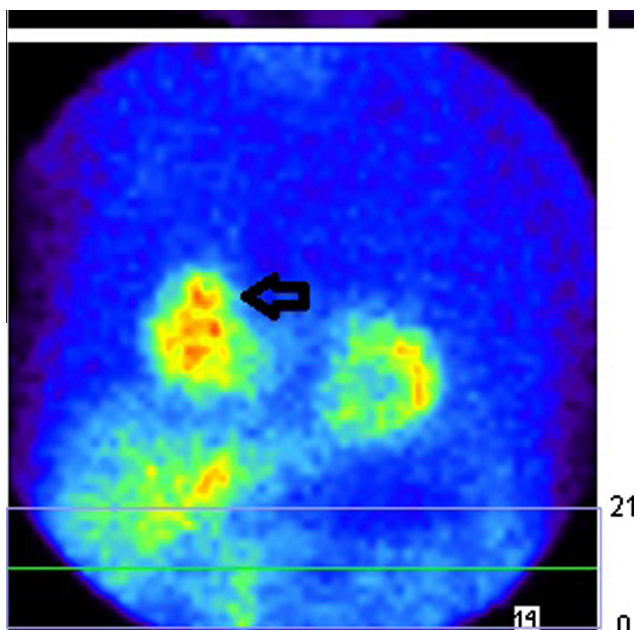


Fig. 2 Raw data of the stress phase show a large area of abnormal tracer accumulation in the mediastinum (arrow).

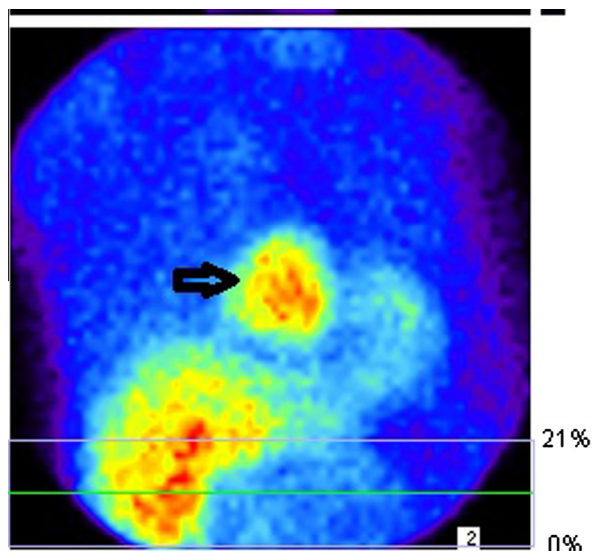


Fig. 3 Raw data of the rest study revealed a large area of abnormal tracer accumulation in the mediastinum, identical to the stress phase (arrow).

related to blood flow, tumor necrosis and mitochondrial activity rather than lesion status (benign or malignant) (3). It accumulates in breast, thyroid, bone, brain and lung cancer (4) but there are sporadic cases of ^{99m}Tc -MIBI uptake in patients with anterior mediastinal mass. (5) In adults, main differential diagnoses of masses in the anterior mediastinum include lymphoma and thymoma (6).

Tc -tetrofosmin is another radiopharmaceutical used for MPI. Most of the reported abnormal extracardiac tracer accu-

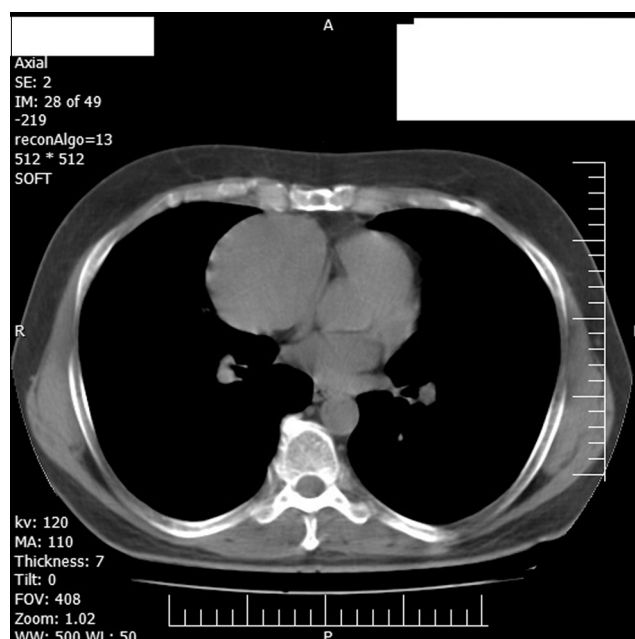


Fig. 4 Spiral lung CT scan without IV contrast.

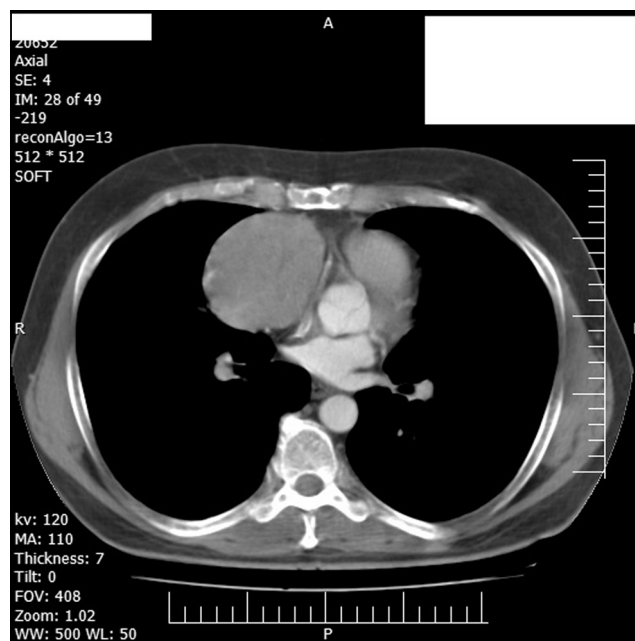


Fig. 5 Spiral lung CT scan with IV contrast shows an enhancing soft tissue mass in the right side of anterior mediastinum.

mulation during MPI had utilized this agent and there are some reports of Tc -tetrofosmin uptake by benign thymomas (7,8).

But rare reports of ^{99m}Tc -MIBI uptake by this kind of tumor have been found. Vast majority of thymic tumors reported as ^{99m}Tc -MIBI-avid are malignant thymomas, and there are very rare reports in the literature showing ^{99m}Tc -MIBI uptake in the benign thymoma. Adalet et al. (1995) and Lanka et al. (2002), each reported one case. Erdogan

et al. reported a 3.5×5 cm ^{99m}Tc -MIBI-avid thymoma in a 45 year old female during MPI (9).

Aydin et al. described a 5.5×1.5 cm thymoma in the upper side of the heart in a 51 year old male (10).

No other reported case of this kind was found. Our case was a large ^{99m}Tc -MIBI-avid benign thymoma.

As was previously noted, there seems to be no direct relation between the intensity of ^{99m}Tc -MIBI uptake and the tumor histology of whether benign or malignant which is also compatible with this case.

Hereby, we should re-emphasize that there is a vital role for evaluating cinematic mode of raw MPI data to discover any unexpected abnormal activity. ^{99m}Tc -MIBI uptake could be seen in masses, which are either benign or malignant. This early detection, especially for malignant lesions is of critical value for patient survival and medical cost.

Conflict of interest

The authors declare that there are no conflict of interests.

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